

OBSERVATIONS OF THE FLOCKING HABITS OF GULLS AND TERNS ON THE MISSISSIPPI COAST

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Descriptions and studies of breeding flocks of gulls and terns are well documented in ornithological literature and have provided some important concepts regarding bird behavior. There are, however, relatively few published accounts of the flocking habits of these birds, or of shore birds in general, during the remainder of the year.

The purpose of this paper is to present data concerning flocks of Laughing Gulls (*Larus atricilla*), Royal Terns (*Thalasseus maximus*), Forester's Terns (*Sterna forsteri*), Least Terns (*Sterna antillarum*), and Black Terns (*Chlidonias nigra*) observed on the coast of Mississippi during July and August 1959. In particular an attempt is made to determine whether mixed flocks of gulls and terns are a function of general gregariousness or whether more intricate mechanisms are involved as revealed by patterns of interspecific combinations or ratios within the flocks.

The Gulf Coast Research Laboratory in Ocean Springs, Mississippi, provided facilities for the study. Field work consisted of visiting available beaches, sandbars, and exposed oyster bars in a small motor boat and enumerating the kinds and numbers of birds found on these areas. Although other means of observation were attempted such as walking the beaches and observing from an automobile, the flocks were least disturbed when the observer approached them in a boat. This is perhaps related to the possibility of predation from land animals in contrast to the relative absence of such dangers in the water.

Using the motor boat technique, a total of 18 field trips were made and 128 flocks enumerated. The same flock sites were necessarily visited repeatedly since the range and extent of the field trips were limited by the mode of transportation and the base of operations. Normally the trips took place during the morning, lasted about five hours, and involved accessible areas within five miles of the laboratory. This in turn implies that very likely the same birds were counted on successive field trips but redistributed

over different flock sites. Table I illustrates the changing composition of flocks on the same site on successive dates.

TABLE I
FLOCKS OBSERVED ON SANDBAR ON SUCCESSIVE DATES

Date	Laughing Gulls	Royal Terns	Forster's Terns	Least Terns
29 July	1		7	
31 July	3	7	25	
3 Aug	35	20	5	
6 Aug	7	4		
7 Aug	5	20	9	16
9 Aug	21	70	20	
10 Aug	13	5	2	
11 Aug	47	2	1	
14 Aug	110	1	1	

As the study progressed it appeared that the flocks were utilizing two kinds of standing sites; open beaches and oyster bars. Table II indicates the size of the flocks and their distribution. The median presents a more representative figure for flock size than does the mean. Beach flocks were considerably larger than the oyster bar groups partly, at least, because of the limited area of the latter site.

Table III shows the flock compositions by species. In terms of Rand's (1954) classification, Laughing Gulls would constitute the Nucleus Species; Royal Terns and Forster's Terns the Attendant Species; and Least Terns and Black Terns the Accidentals.

Since Laughing Gulls, Royal Terns, and Forster's Terns were found together frequently, it appeared that the associations might have some ecological significance. In order to test this, species were compared in couplets in two by two tables utilizing a presence or absence criterion (Table IV). The null hypothesis for this situation stated that the interspecific composition of the flocks had no significance other than that expected by chance. As seen in Table IV, the species associations were not statistically significant; hence the species composition of the flocks appears to be a function of the numbers of individuals in the area and that for these three species there is no interspecies attraction. As Rand (1954) pointed

TABLE II
SIZE AND DISTRIBUTION OF FLOCKS

	Number of Flocks	Total birds in Flocks	Median Flock Size	Mean Flock Size	Range
All flocks	128	9738	39	76	4 - 472
Beach	87	8230	56	95	4 - 472
Oyster Bar	41	1508	28	37	8 - 184

TABLE III
COMPOSITION OF THE FLOCKS BY SPECIES

	Total Number of Laughing Gulls	Royal Terns	Forster's Terns	Least Terns	Black Terns
All flocks	6558 (67)	1600 (16)	1317 (13)	109 (1)	114 (1)
Beach	5560 (68)	1427 (17)	1010 (12)	91 (1)	107 (1)
Oyster Bar	998 (66)	173 (11)	307 (20)	18 (1)	7 (0.1)

Numbers in parentheses represent per cents

TABLE IV
TWO BY TWO TABLE AND THE RESULTS OF THE
SPECIES COMPARISON

Species B

	Present	Absent	
Species A	Present	a	b
	Absent	c	d
		a + c	b + d

$$\text{Chi-square} = \frac{(ad - bc)^2 n}{(a+b)(a+c)(c+d)(b+d)}$$

Species compared	Chi-square value
Laughing Gulls—Royal Terns	2.6
Laughing Gulls—Forster's Terns	1.5
Royal Terns—Forster's Terns	0.37

p > 0.10

p > 0.20

p > 0.30

out, mixed flocks such as these are not based on food benefits. Also these aggregates do not form due to a limited habitat preference since there were many miles of beaches and sandbars not utilized by the flocks. It would seem that general gregariousness rather than specific species attraction is the basis for the aggregations noted in this paper.

OBSERVATIONAL NOTES ON FLOCK BEHAVIOR

In the mixed flocks the gulls, Royal Terns and Forster's Terns appeared to be mixed at random on the standing sites. The Least Terns, Black Terns and occasional Black Skimmers, when present, always stayed somewhat apart from the main flock. There was very little interaction between members of a flock until a bird attempted to land among them. The birds which had to make room for the "intruder" then made threatening gestures toward it with their bills and uttered several calls. Based on this type of behavior it seemed that Royal Terns were dominant in the "peck order" as they could displace any of the other species on the standing sites. The Laughing Gulls in turn dominated the other terns. These relations were true of flocks on beaches and bars and birds perched on clusters of pilings.

Frequently immature gulls and terns were observed "posturing", e.g., extending the neck and body in a horizontal plane, and peeping loudly to nearby adults. The adult birds either ignored these birds or moved away if they became persistent. On one occasion an adult gull was observed to respond by feeding the posturing immature gull.

LITERATURE CITED

RAND, AUSTIN L.

1954. Social feeding behavior of birds. *Fieldiana: Zoology*. Vol. 36, No 1. Chicago Natural History Museum, March 10, 1954.